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SAVING THE LAST GREAT PLACES ON EARTH

Designing MPAs to Survive Coral Bleaching

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Challenge as Usual

For many **human** impacts that destroy coral reefs, we **can** intervene at the **source** of stress

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Challenge Ahead

For global unmanageable stresses (climate-related coral bleaching) we need different **response strategies**

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Doom and Gloom

Examples:

- By 2050, **70%** of coral reefs destroyed (another 50% lost)
- 1998 El Niño killed **90+%** of corals on some reefs

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The Good News

Some corals **survive**

Some coral communities are more ***resistant*** to bleaching (they don't bleach or bleach and don't die)

Some coral communities are more ***resilient*** to bleaching (corals bleach and may die but the community bounces back)

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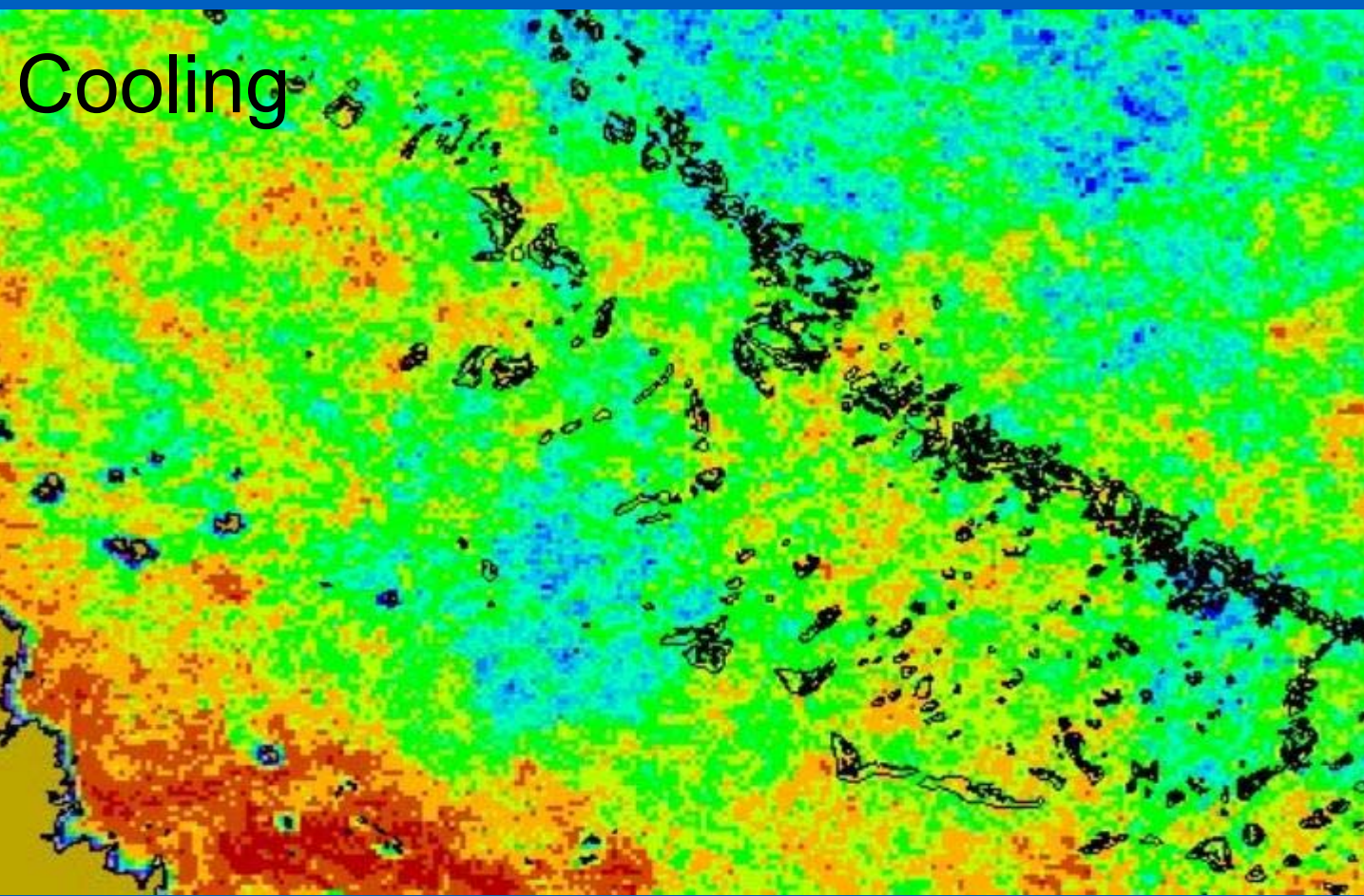
What can managers do?

1. Identify and fully protect resistant and resilient coral communities



Managers need fine resolution (1 km) SST maps & bleaching risk models

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Shading

High island shadow

Jez O'hare

Rock overhangs

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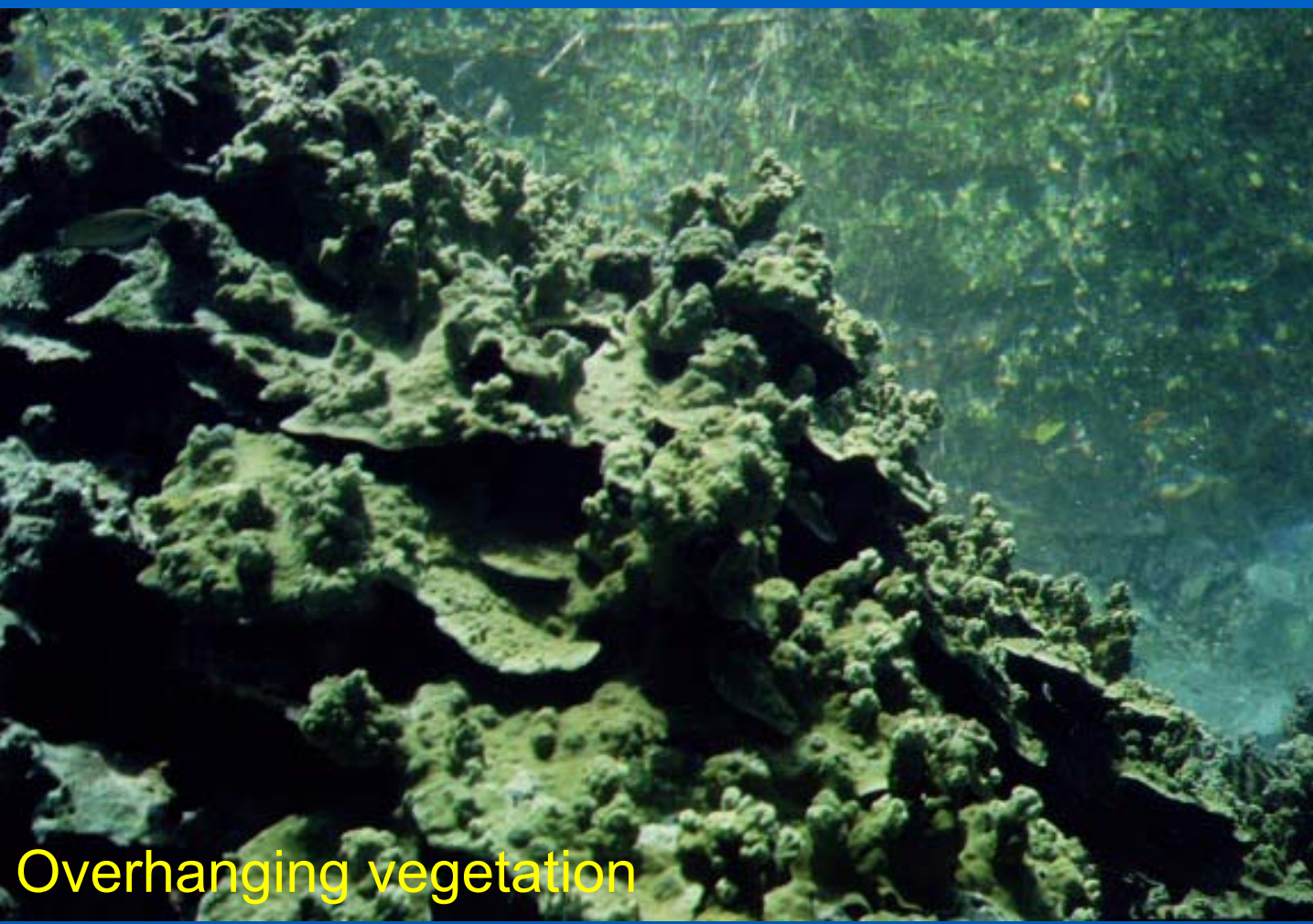

Overhanging vegetation

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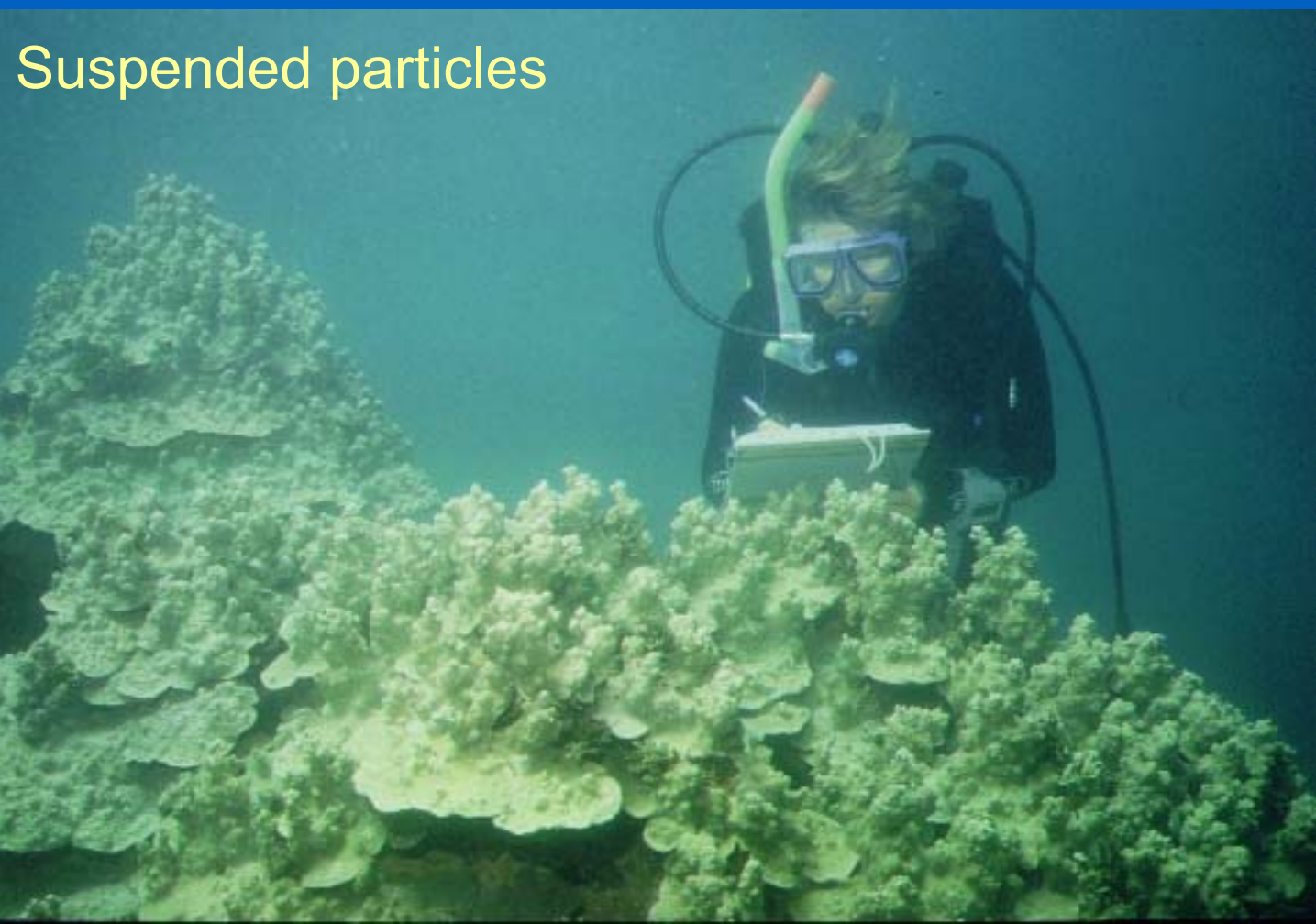
Screening

Suspended particles



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Stress tolerance

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Dead down the slope

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Resilience

Managers need tools to help them identify resistant and resilient coral communities

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2. Manage coral predators

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3. Manage water quality

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4. Manage herbivore fisheries

Managers need means to identify indicators of reef health, protocols for reef monitoring, and guidelines on appropriate management interventions

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TNC's Developing Model

REPRESENTATION & REPLICATION

Habitat types
Multiples → Spreading the risk

+

REFUGIA

Resistant Communities
Spawning aggregations → Secure Sources

+

CONNECTIVITY

Transport → Replenishment

+

EFFECTIVE MANAGEMENT

Strong Recruitment → Enhanced Recovery

=

RESILIENCE

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MPA SELECTION/DESIGN

Additional Criteria:
representation
bleaching resistance
spawning aggregation
connectivity

Strong recruitment

150' Visibility
70% Mortality

Strong current

30' Visibility
5% Mortality

Fully protected
Multiple use
Reefs to Ridges

20' Visibility
2% Mortality

Selection Criteria:
scenic
clear water
accessible
safe
high biodiversity
abundant fishes

150' Visibility
70% Mortality

Weak recruitment

Tourist resorts

Marine Protected Area

Ocean Currents

Coral Reef

Spawning Aggregations

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MPA Design Approach

Build resistance and resilience into design of coral conservation sites:

- Address usual stresses
- Spread the risk
- Factor resilience into site selection
- Fully protect resistant coral communities
- Manage susceptible areas to enhance recovery
- Nest MPAs into broader management frameworks

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If you do what you've always done, you'll get what you've always gotten

- Anon

Ron Petocz